## Amendments to the Claims

1-15. (canceled)

16. (currently amended) In a communication system for communicating with a plurality of mobile nodes, the system having a plurality of home agents, the plurality of home agents managing Internet Protocol (IP) addresses in multiple address pools, the multiple pools having overlapping IP addresses and each pool being associated with a unique home agent IP address, a method comprising:

~~assigning a home IP address to a given mobile node from one of the multiple pools; and~~ in a foreign agent, receiving a plurality of data packets from the plurality of home agents, each packet containing an IP address of the respective home agent, wherein at least one data packet destined for a given mobile node has the same assigned home IP address as at least one other mobile node;

in ~~a mobility~~ the foreign agent, using a combination of the assigned home IP address of the given mobile node and ~~an~~ the IP address of a home agent to ~~uniquely~~ identify a ~~communication~~ unique point-to-point protocol (PPP) link for the given mobile node; and

in the foreign agent, routing the at least one data packet destined for the given mobile node to the given mobile node using the unique PPP link.

17. (currently amended) The method of claim 16, ~~wherein the mobility agent comprises a foreign agent~~ further comprising:

in the foreign agent, receiving a packet from a mobile node over a PPP link, the link associated with an associated PPP link address and the packet containing a home IP address of the mobile node, using a combination of the associated PPP link address and home IP address to determine a unique home agent IP address, and routing the packet to the home agent using the unique home agent IP address.

18. (cancelled)

19. (cancelled)

20. (cancelled)

21. (currently amended) A communication system for communicating with a plurality of mobile nodes in a communication system, the communication system having a plurality of home agents, the plurality of home agents managing multiple Internet Protocol (IP) address pools having overlapping IP addresses, each pool being associated with a unique home agent IP address, wherein a home IP address for a given mobile node is associated with one of the multiple pools, the system comprising:

a ~~mobility~~ foreign agent that uses a combination of the home IP address and an IP address of a home agent from a packet to ~~uniquely~~ identify a ~~communication~~ unique point-to-point protocol (PPP) link for the given mobile node; and

wherein the foreign agent routes the packet to the mobile node using the unique PPP link.

22. (currently amended) The communication system of claim 21, wherein the ~~mobility agent is a~~ foreign agent receives a packet on a PPP link from a mobile node, the packet containing a home IP address and a PPP link address associated with the PPP link, and determines a unique home agent IP address from a combination of the associated PPP link address and home IP address, and routes the packet to the unique home agent IP address.

23. (cancelled)

24. (currently amended) A ~~mobility~~ foreign agent for use in a communication system for communicating with a plurality of mobile nodes, wherein the communication system comprises a plurality of home agents, the plurality of home agents managing Internet Protocol (IP) addresses included in multiple address pools, the multiple address pools having one or more overlapping IP addresses and each pool being associated with a unique home agent IP address, the ~~mobility~~ foreign agent comprising:

a processing device;

a storage device having a plurality of machine executable instructions that, when executed by the processing device, provide for:

using a combination of an assigned home IP address of the given mobile node and an IP address of a home agent with which the mobile node is associated to ~~uniquely~~ identify a ~~communications~~ unique point-to-point protocol (PPP) link for a given mobile node of the plurality of mobile nodes; and

routing a packet destined for the mobile node using the unique PPP link.

25. (currently amended) The ~~mobility~~ foreign agent of claim 24, wherein the ~~mobility agent comprises a foreign agent~~ the plurality of machine instructions further provide for:

receiving a packet on a PPP link from a mobile node, the packet containing a home IP address and the PPP link having an associated PPP link address;

determining a unique home agent IP address with the associated PPP link address; and

routing the packet to the home agent using the unique home agent IP address.

26. (currently amended) The ~~mobility~~ foreign agent of claim 24, wherein the ~~mobility~~ foreign agent is implemented in a remote access server.

27. (cancelled).

28. (cancelled).

29. (cancelled)

30. (currently amended) A ~~mobility~~ foreign agent for routing a data packet associated with a given mobile node, the ~~mobility~~ foreign agent comprising:

machine executable instructions that when executed provide for:

processing the data packet associated with the given mobile node, the processing including:

associating a home Internet Protocol (IP) address and a home agent IP address contained in said data packet to determine a unique ~~communication~~ point-to-point protocol (PPP) link address corresponding with the given mobile node; and

routing the data packet to the given mobile node via the unique ~~communication~~ PPP link address.

31. (currently amended) The ~~mobility~~ foreign agent of claim 30, wherein the instructions further provide for maintaining a table mapping ~~communication~~ PPP link addresses to unique pairs of home IP addresses and home agent IP addresses, and

wherein associating home Internet Protocol (IP) addresses and home agent IP addresses is accomplished by reference to the table, such that multiple mobile nodes having the same home IP addresses but different home agent IP addresses may be distinguished from each other.

32. (currently amended) The ~~mobility~~ foreign agent of claim 30, wherein the ~~mobility~~ foreign agent comprises a remote access server for establishing respective ~~communications~~ PPP links with one or more mobile nodes.

## Remarks

### 1. Summary of Office Action

In the Office Action mailed May 31, 2007, the Examiner rejected claims 16-25, 27-29 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,445,922 (Hiller) in view of U.S. Patent 6,501,746 (Leung). Claim 26 was rejected under 35 U.S.C. § 103(a) as being obvious over Hiller and Leung further in view of U.S. Patent No. 6,061,650 (Malkin). The Examiner rejected claims 30 and 31 under 35 U.S.C. § 102(e) as being anticipated by Hiller. Claim 32 was rejected under 35 U.S.C. § 103(a) as being obvious over Hiller in view of Malkin.

### 2. Status of the Claims

Currently pending are claims 16-32 of which claims 16, 21, 24, and 30 are independent, and the remainder are dependent. To expedite prosecution, Applicant has amended claims 16-17, 21-22, 24-26, and 30-32. Applicant has also cancelled claims 18-20, 23, and 27-29.

### 3. Response to § 102 Rejections for Claims 30 and 31

As amended, claim 30 teaches (a) a foreign agent for routing a data packet associated with a given mobile node that comprises (b) machine executable instructions that provide for (c) processing a data packet associated with a given mobile node, where the processing includes (d) associating a home Internet Protocol (IP) address and a home agent IP address contained in said data packet to determine a unique point-to-point protocol (PPP) link address corresponding with the given mobile node, and (e) routing

the data packet to the given mobile node via the unique PPP link address. The Examiner rejected claims 30-32 as being anticipated by Hiller.

Applicant asserts Hiller does not disclose at least the elements of a foreign agent comprising machine executable instructions that (1) associates a home Internet Protocol (IP) address and a home agent IP address contained in a data packet to determine a unique point-to-point protocol (PPP) link address corresponding with the given mobile node, and (2) routes the data packet to the given mobile node via the unique PPP link address.

Claim 30 teaches a simpler, more reliable system than the system described by Hiller. Hiller describes use of two separate network entities - a FA and an inter-working function (IWF) - for routing data packets associated with a home IP address and home agent IP address pair to a mobile node. Hiller, col. 4, lines 50-61. To uniquely identify a mobile node between the IWF and FA, Hiller describes use of a Network Address Identifier (NAI). Hiller, col. 5, lines 1-4. The NAI is attached to each data packet transmitted in the visited data network. Id. In the IWF, the NAI is stored in a Mobile Identity table, where the NAI is associated with the mobile node's link layer identifier and home IP address. Hiller, col. 5, lines 40-43. In the FA, the NAI is stored in a Visitor List table, where the NAI is associated with the mobile node's home agent address and home IP address. Hiller, col. 5, lines 43-45.

To communicate the NAI between the IWF and FA, Hiller describes use of a composite packet. For traffic in the forward direction; that is, from the home network to the mobile node, the FA receives packets from the home agent over the IP layer, looks up the NAI Visitor List table based on the home IP address and home agent IP address, creates a composite packet that includes the NAI, and routes the composite packet to the

IWF. Hiller, col. col. 7, line 59 – col. 8, line 2. The IWF extracts the NAI from the composite packet, looks up the NAI in the Mobile Identity table to find the link identifier, and routes the original packet to the mobile node. Hiller, col. 8, lines 3-8.

For traffic in the reverse direction; that is, from the mobile node to the home network, the IWF receives packets from the mobile node over the link layer, looks up the NAI in the Mobile Identity table, resolves any link layer overlaps, creates a composite packet that includes the NAI, and routes the composite packet to the FA. Hiller, col. 7, lines 18-46. The FA then extracts the NAI from the composite packet, looks up the NAI in the Visitor List table, resolves any NAI overlaps, finds the home agent IP address, and routes the original (pre-composite) packet sent by the mobile node to the home agent using the home agent IP address. Hiller, col. 7, lines 44-58.

Hiller's scheme first describes the use of two network entities – the IWF and FA – to route packets between the home network and the mobile node. Specifically, as described above, no one network entity in Hiller's scheme provides all the information required to associate a home IP address and home agent IP address with a PPP link address. As claimed, Applicant's invention only requires the use of one network entity – the FA – to perform the same association and does not require the use of an NAI or equivalent.

To communicate the NAI between network entities, Hiller requires the extraneous steps of composite packet creation, and NAI extraction in both the reverse (from mobile to home network) and forward (from home network to mobile) directions on a per packet basis. Hiller's composite packet processing is not required by Applicant's invention, so Applicant's invention potentially leads to faster processing of each packet than Hiller.

Further, Hiller's use of multiple network entities could lead to data inconsistencies between the entities. Hiller requires a method for resolving NAI overlaps, when a mobile node with two different NAIs and two or more home addresses, potentially having multiple link identifiers. Hiller, col. 5, lines 47-50. Hiller recognizes this overlap can occur once detected, and resolves this overlap by determining a unique NAI and mobile node's home IP address. Hiller, col. 5, lines 50-53. Applicant's invention does not have inter-entity inconsistencies as only the FA associates a home IP address and home agent IP address with a PPP link address. Applicant's invention does not require a NAI overlap detection/resolution scheme, unlike Hiller. Use of only one network entity makes Applicant's invention more reliable as there are fewer devices to fail and less concern of data inconsistencies than in Hiller's scheme.

To summarize, Applicant's system is both simpler, potentially faster, and more reliable than Hiller, for at least the reasons that: (1) only one network entity (the FA) is involved, so no inter-entity communication, such as composite packets, is required (2) no composite packet processing is required, leading to potential performance gains and (3) no NAI overlaps can occur, so no NAI overlap detection/resolution scheme is required. Therefore, Applicant asserts Hiller does not teach to a foreign agent comprising machine executable instructions that (1) associates a home Internet Protocol (IP) address and a home agent IP address contained in said data packet to determine a unique point-to-point protocol (PPP) link address corresponding with the given mobile node, and (2) routes the data packet to the given mobile node via the unique PPP link address.

For at least the reasons described above, Applicant asserts that Hiller does not anticipate claim 30. As Hiller's scheme did not anticipate claim 30 as amended, Applicant respectfully requests allowance based for at least the reasons specified above.

Further, claim 31 should be allowed, for at least the reason that it depends on an allowable claim.

**4. Response to § 103 Rejections**

**a. Claims 16-17**

As amended, claim 16 is for a method in (a) a communications system for communicating with a plurality of mobile nodes, (b) the system comprising a plurality of home agents (c) the plurality of home agents manage Internet Protocol (IP) addresses in multiple address pools, (d) the multiple pools having overlapping IP addresses, and (e) each pool being associated with a unique home agent IP address. The method of claim 16 comprises: (1) in a foreign agent, receiving a plurality of data packets from the plurality of home agents, each packet containing an IP address of the respective home agent, wherein at least one of the data packets destined for a given mobile node has the same assigned home IP address as at least one other mobile node; (2) in the foreign agent, using a combination of the assigned home IP address of the given mobile node and an IP address of a home agent to identify a unique point-to-point protocol (PPP) link for the given mobile node; and (3) in the foreign agent, routing the at least one data packet destined for the given mobile node to the mobile node using the unique PPP link.

The examiner cited Hiller in view of Leung and rejected claim 16. Office Action, p. 4. As stated above, Hiller does not describe a foreign agent capable of either (a) using a combination of the assigned home IP address of the given mobile node and an IP address of a home agent to uniquely identify a PPP link for the given mobile node or (b) routing packets to the mobile node over the uniquely identified PPP link.

Applicant asserts that Leung does not cure these deficiencies in Hiller. Leung describes a system by which an IP address is assigned to a mobile node during

registration, associating a mobile node ID with the mobile ID, along with Home Agent (HA) and Foreign Agent (FA) processing of registration messages. Leung, Abstract. Leung describes a mobile node ID as follows: "each mobile node will typically have a unique mobile node ID such as that used by the manufacturer (e.g., a serial number or MAC address)... [that] may therefore be used to identify the mobile node during the registration process until an IP address is assigned to the mobile node." Leung, col. 4, line 67 – col. 5, line 5. In describing FA processing, Leung states that the FA should update its visitor table when receiving a registration reply. Leung, col. 12, lines 63-65. Each visitor table entry "includes a mobile node ID 1006 associated with one of the mobile nodes and an IP address 1008 associated with the mobile node ID." Leung, col. 13, lines 3-5.

The mobile node ID, as stated above, is its statically assigned serial number or MAC address. Leung does not describe use of the mobile node ID for routing packets to the mobile node, and so does not describe a FA capable of associating a home IP address with a PPP link. Further, Leung does not describe how the FA would route packets to the mobile using a PPP link as claimed in claim 16. Therefore, Leung does not cure the deficiencies in Hiller.

As Leung does not cure the deficiencies in Hiller, Applicant asserts that claim 16 is not obvious over Hiller in view of Leung. Applicant respectfully requests allowance for claim 16 for at least the reasons described above. Further, claim 17 should be allowed, for at least the reason that it depends on an allowable claim.

**b. Claims 21-22 and 24-26**

The Examiner cited to Hiller in view of Leung and rejected independent claims 21 and 24. For dependent claim 26, the Examiner cited to Hiller in view of Leung and Malkin.

Both claims 21 and 24 have similar language to claim 16. As stated above, claim 16 is not obvious over Hiller in view of Leung. Applicant asserts that claims 21 and 24 are allowable for at least the same reasons presented for claim 16. Further, Applicant asserts claims 22 and 23 are in allowable form for at least the reason that they depend on allowable claim 21. Applicant also asserts claims 25-26 are in allowable form for at least the reason that those claims depend on allowable claim 24. Applicant does not acquiesce in the assertions the Examiner made more specifically regarding claim 26, but Applicant submits those assertions are moot in view of the allowability of the parent claim.

**c. Claim 32**

The Examiner cited to Hiller in view of Malkin in rejecting claim 32. Claim 32 is dependent on claim 30. As described above in Section 3, claim 30 is in allowable form. Applicant asserts claim 32 is in allowable form for at least the reason that it depends on an allowable claim. Applicant does not acquiesce in the assertions the Examiner made more specifically regarding claim 32, but Applicant submits that those assertions are moot in view of the allowability of the parent claims.